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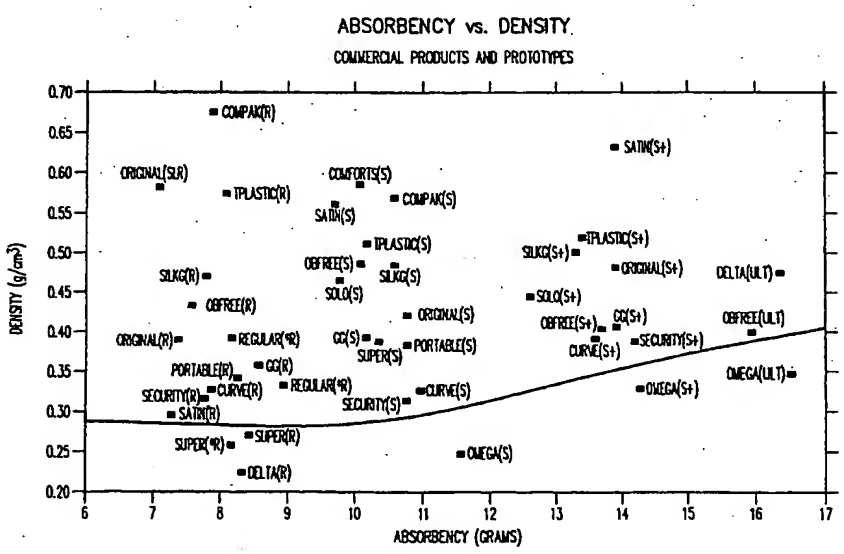
(54) Title: PRE-EXPANDED TAMPON PLEDGET



(57) Abstract: A pre-expanded tampon pledget having a length comparable to known, compressed tampon pledgets, yet having a diameter from about 25 % to about 45 % larger than the known tampon pledgets. In addition, this tampon pledget has a fiber content from about 10 % to about 25 % less than the known tampon pledgets. This pre-expanded pledget has a density about one-third less than the known tampon pledgets and, accordingly, is softer and more comfortable. It is also less expensive to manufacture since fewer fibers are used. Nonetheless, the pre-expanded tampon pledget is about equally absorbent, and has better leakage protection than the comparable known tampon pledgets.

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PRE-EXPANDED TAMPON PLEDGET

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to an improved tampon or tampon pledget. More particularly, the present invention relates to a tampon pledget that is pre-expanded. Furthermore, the pre-expanded tampon pledget has less density and, preferably, has fewer fibers, yet provides the same or improved leakage protection and performance as known, compressed tampon pledgets.

Tampon pledgets are typically compressed either during manufacture or prior to placement in a tampon applicator. These tampon pledgets normally have their fibers compressed to enable easy ejection of the tampon pledget from the applicator and, more importantly, easy insertion of the tampon pledget. In such a tampon pledget, the pledget's fibers will expand significantly upon initial contact with moisture. Once expanded, the tampon pledget will eventually conform to the body's contours to provide leakage protection. Conventionally, more fibers have been included, thereby increasing density (fibers per unit volume), in order to achieve better leakage protection. Such an increase in fibers normally results in a more tightly compressed tampon pledget.

Heretofore, there has been a lack of appreciation of the benefits of providing a tampon pledget that is less dense and, thus, has fewer fibers per unit volume. In addition, there has been a lack of appreciation that lower density or fewer fibers per unit volume may improve leakage protection.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a tampon pledget that has less density than known tampon pledgets.

It is another object of the present invention to provide such a tampon pledget that has less density, yet has improved leakage protection than known tampon pledgets.

It is a further object of the present invention to provide such a tampon pledget that is comfortable and softer.

It is still a further object of the present invention to provide such a tampon pledget that is less costly than known tampon pledgets.

Accordingly, the present invention provides a pre-expanded tampon pledget that contains absorbent fibers, preferably within a coverstock. This pre-expanded pledget contains fibers that are not tightly compressed and have fewer fibers per unit volume than a comparably sized compressed tampon pledget. Moreover, this pre-expanded tampon pledget preferably has density approximately one-third less than compressed tampon pledgets of comparable volume.

DESCRIPTION OF THE INVENTION

The tampon pledget of the present invention is called a pre-expanded tampon pledget. As used in this application, pre-expanded means that the tampon or tampon pledget in its initial condition, such as just prior to use, has an expanded or larger diameter, and thus volume, yet a lower density, than a conventional or known tampon pledget in its initial condition. However, when fully expanded after absorption of fluid, this pre-expanded tampon pledget and the conventional or known tampon pledgets have about the same diameter.

The length of the pre-expanded tampon pledget is preferably approximately the same length as known tampon pledgets. The pre-expanded tampon pledget of the present invention can be crimped or compressed to a certain extent. However, the pre-expanded tampon pledget of the present invention has a diameter in its initial condition from about 25% to about 45% larger than known tampon pledgets in the same absorbency range. Preferably, the diameter is about 41% larger than any known tampon pledget in the same absorbency range.

By simply enlarging the diameter of this pre-expanded tampon pledget while maintaining the same amount of fiber, the tampon pledget is less dense. However, to improve the benefits of this pre-expanded tampon pledget, the pledget has from about l0% to about 25% less fiber, preferably about l0% to about 20%, than is used in any known tampon pledget of comparable absorbency. Thus, this pre-expanded tampon pledget has a much lower fiber density than any presently known tampon pledget. As used in this application, density means the total weight of fibers per unit volume.

Since density is the weight of the fiber or fibers per unit volume and the length of the pre-expanded tampon is basically the same as known tampon pledgets, the pre-expanded tampon pledget according to the present invention has a volume that is proportional to the diameter squared. Accordingly, the pre-expanded tampon pledget of the present invention, in its initial condition, is about 25% to about 45%, and more preferably about 41%, greater in volume than known tampon pledgets of comparable length and in a comparable absorbency range. This is due to the greater diameter of this pre-expanded tampon pledget.

When the volume of the pre-expanded tampon pledget is increased beyond approximately 45% over known tampon pledgets, insertion comfort can be compromised. In addition, when the volume of the pre-expanded tampon pledget is only increased to about 17% or less over known tampon

pledgets, there has not been found to be a benefit in leakage protection.

As stated above, to maximize its benefits, this pre-expanded tampon pledget has from about 10% to about 25% fewer fibers per unit volume than known tampon pledgets. Preferably, the pre-expanded tampon pledget has from about 10% to about 20% less fiber per unit volume than known tampon pledgets.

In a preferred embodiment, the fiber present in the pre-expanded pledget is much less compressed than the fiber in known tampon pledgets. In the most preferred embodiment of the present invention, the fiber in the pre-expanded tampon pledget may be as much as about three times less compressed than the fiber in known tampon pledgets.

Despite the much lower fiber density, as well as less compression, this pre-expanded tampon pledget unexpectedly provides protection against leakage that is comparable or better than known tampon pledgets.

The pre-expanded tampon pledget is also softer and more flexible than present tampon pledgets due to lower fiber density. Accordingly, this tampon pledget is comfortable to insert and during wear, and is believed more comfortable than known tampon pledgets. Also, the initial, pre-expanded condition of this tampon pledget can make the pledget conform more quickly to the user since less moisture is needed to contact the pledget to cause the expansion found in known tampon pledgets.

In short, by enlarging the tampon pledget's diameter (pre-expanded) and removing up to about 25% of the fiber, the density is greatly decreased, yet leakage protection is unexpectedly improved. To achieve a preferred reduction in fiber density between about 25% to about 45%, which is approximately one-third less than present tampon pledgets comparable volume, there preferably should be about 10% to about 25% less fiber, more preferably about 10% to about 20% less fiber in the pre-expanded tampon pledget.

It should be understood that the above applies to a pre-expanded pledget without the effect of a coverstock. However, the pre-expanded pledget can be used with a coverstock. The coverstock can be any conventional coverstock, such as, for example, spunbonded polypropylene. It can also be any special type of coverstock. Also, the coverstock can entirely cover or partially cover the tampon pledget. However, the coverstock should not impinge upon the pre-expanded state of the tampon pledget.

Tests have demonstrated the performance of the tampon pledget made in accordance with the present invention. The graph shown in Fig. 1 illustrates a syngyna test of known tampons versus pre-expanded tampons of various diameters.

The several tampon pledgets of the present invention are designated as Delta Regular(R), Super Regular(R), Omega Super(S), Super Plus(S+), and Omega Ultra (ULT). These pledgets have the following weight of fibers and initial diameter.

Tampon Pledget	Weight of fibers per gram	Diameter (inches)
Delta Regular	1.87	0.67
Super Regular	2.05	0.62
Omega Super	2.50	0.73
Omega Super Plus	3.15	0.73
Omega Ultra	3.95	0.73

The commercial products tested include three Regular(R), Super(S) and Super Plus(S+) for products under the following trademarks/names: Satin Touch, Silk Glide and Gentile Glide, all nine tampons are distributed by Playtex Products, Inc.; OB Free Regular(R), Super(S) and Ultimate(ULT), all three of which are sold by Personal Products Company, Kotex Security Regular(R), Super(S) and Super Plus(S+), all three of which

are sold by Kimberly Clark Corp. It should be noted that all Personal Products company, Kimberly Clark Corp and Playtex Products, Inc. Silk Glides products have coverstocks. However, the coverstocks should not effect the data provided above.

Fig. 1 is a plot of density in grams versus absorbency in grams. The density numbers are dry numbers. As shown in the plot, the present invention has the only tampons with a density of 0.29 grams/cm3 or less in all absorbency ranges. In fact, the absorbency remains relatively constant from about 6 grams to about 10.7 grams.

At about 10.5 grams of absorbency, the plot increases 0.02 grams/cm3 of density for every one gram of absorbency. The tampon pledgets of the present invention remain below that line throughout the plot. Thus, the tampon pledget of the present invention in any point of the absorbency range commencing from about 10.5 grams and greater has a density less than known tampon pledgets. Even at this range, the pre-expanded tampons illustrate improved absorbency per unit of density.

It should be noted that since the amount of fiber in each pre-expanded tampon pledget is decreased, the cost of the finished tampon pledget is decreased.

The pre-expanded tampon pledget of the present invention is preferably of cross-pad construction. However, the pre-expanded tampon pledget can also have a flat pad or rolled construction.

Various modifications may be made as will be apparent to those skilled in the art. Thus, it will be obvious to one of ordinary skill in the art that the foregoing description is merely illustrative of certain preferred embodiments of the present invention, and that various obvious modifications can be made to these embodiments.

What is claimed is:

1. A tampon pledget having a density of about 0.29 grams per cubic centimeter or less, and an absorbency from about 6 grams and greater.

2. The tampon pledget of claim 1, wherein the tampon pledget has from about 10% to about 25% less fiber than any known tampon pledget.

3. The tampon pledget of claim 1, wherein the tampon pledget has from about 10% to about 20% less fiber than any known tampon pledget.

4. The tampon pledget of claim 1, wherein the tampon pledget has from about 10% to about 25% less fiber per unit volume than any known tampon pledget.

5. The tampon pledget of claim 1, wherein the tampon pledget has from about 10% to about 20% less fiber per unit volume than any known tampon pledget.

6. The tampon pledget of claim 1, wherein the tampon pledget has fiber that is less compressed than fiber in any known tampon pledget.

7. The tampon pledget of claim 1, wherein the tampon pledget has a reduction in fiber density between about 25% and about 45%.

8. The tampon pledget of claim 1, wherein the tampon pledget has a reduction in fiber density of about 41%.

9. The tampon pledget of claim 1, wherein the tampon pledget has a reduction in fiber density between about 25% to about 45%, and about 10% to about 25% less fiber than any known tampon pledget.

10. The tampon pledget of claim 1, wherein the density remains

relatively constant from about 6 grams to about 10.7 grams syngyna absorbency.

11. The tampon pledget of claim 1, wherein the tampon pledget has a cross-pad construction.

12. The tampon pledget of claim 1, wherein the tampon pledget has a radial construction.

13. The tampon pledget of claim 1, further comprising a coverstock about at least a portion of the tampon pledget.

14. The tampon pledget of claim 1, further comprising a coverstock about the tampon pledget.

15. A pre-expanded tampon pledget that has in any point of an absorbency range commencing from about 10.5 grams and greater, a density less than any known tampon pledget.

16. A pre-expanded tampon pledget, the tampon pledget comprising:

from about 10% to about 25% less fiber than any known tampon pledget;

a reduction in fiber density between about 25% to about 45% than the known tampon pledget,

wherein the tampon pledget will have a fiber density of about 0.29 grams per cubic centimeter or less, for any absorbency from about 6 grams and greater.

17. The tampon pledget of claim 16, wherein the absorbency remains relatively constant from about 6 grams to about 10.7 grams.

18. The tampon pledget of claim 16, wherein the tampon pledget has from about 10% to about 20% less fiber than the known tampon pledget.

19. The tampon pledget of claim 16, wherein the tampon pledget has a reduction in fiber density of about 41%.

20. The tampon pledget of claim 1, further comprising a coverstock about at least a portion of the tampon pledget.

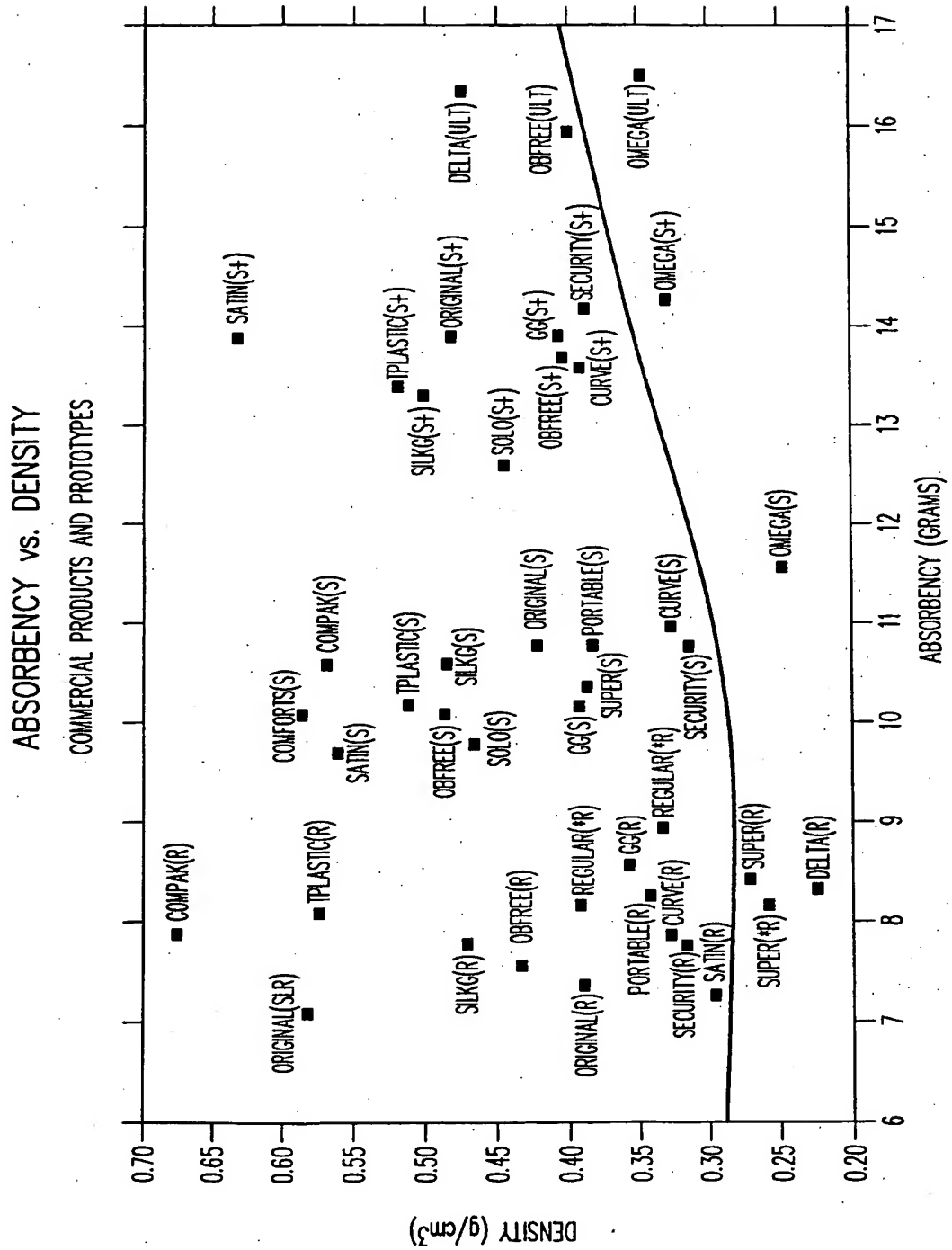
ABSORBENCY vs. DENSITY
COMMERCIAL PRODUCTS AND PROTOTYPES
DENSITY (g/cm³)
ABSORBENCY (GRAMS)
0.70
0.65
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
6
7
8
9
10
11
12
13
14
15
16
17
COMPAK(R)
ORIGINAL(SLR)
TPLASTIC(R)
SILKG(R)
OBFREE(R)
ORIGINAL(R)
REGULAR(*R)
PORTABLE(R)
GG(R)
SECURITY(R)
CURVE(R)
SATIN(R)
SUPER(*R)
SUPER(R)
DELTA(R)
COMFORTS(S)
SATIN(S)
COMPAK(S)
TPLASTIC(S)
OBFREE(S)
SILKG(S)
SOLO(S)
ORIGINAL(S)
GG(S)
PORTABLE(S)
SUPER(S)
REGULAR(*R)
CURVE(S)
SECURITY(S)
OMEGA(S)
SATIN(S+)
TPLASTIC(S+)
SILKG(S+)
SOLO(S+)
OBFREE(S+)
GG(S+)
CURVE(S+)
ORIGINAL(S+)
SECURITY(S+)
DELTA(ULT)
OBFREE(ULT)
OMEGA(S+)
OMEGA(ULT)

FIG. 1

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/33011

A. CLASSIFICATION OF SUBJECT MATTER
IPC(7) :A61F 13/15
US CL : 604/904
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 604/904, 385.17, 385.18, 385.01

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
none

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
East text search

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4,543,098 A (Wolfe et al.) 24 September 1985, see entire document	1,11-14

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search 21 FEBRUARY 2001	Date of mailing of the international search report 13 MAR 2001
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer DENNIS RUHL Telephone No. (703) 308-2262

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/33011

BOX I. OBSERVATIONS WHERE CLAIMS WERE FOUND UNSEARCHABLE

2. Where no meaningful search could be carried out, specifically:

These claims are reciting a tampon in relation to "any known tampon pledget" and because of this the scope cannot be determined. It is not known what this phrase means and therefore a search cannot be made if it is not known what is being claimed. These claims are extremely unclear and no meaningfull search could be conducted.

1. Discussion of Inner Tube
2. Dimensions of the tampon applicator
    a. measure depth from the leading edge/depth in three ways
        i.) when the second end of the tampon is in contact with the first end of the inner member
        ii.) when the inner member is embedded in the tampon (the inner member is within the tampon
        iii.) when the tampon is embedded in the inner tube
3. Outer member is optional
4. Tampon positioning member is optional